

to by the distinguished biologists present. In the evening a pleasant excursion was made into the surrounding country.

A splendid album had been manufactured at Vienna for presentation to Schwann, containing the photographs of almost all living biologists. Unfortunately it arrived too late to be formally presented at the ceremony. The expense of the bust was defrayed by subscriptions in Belgium, though a few strangers (among them Mr. Darwin) had an opportunity of contributing.

The whole ceremony was extremely interesting and successful, and we trust the hero of it may still live many years in which he may have the pleasure of looking back upon his jubilee, and of feeling that his labours have been appreciated by his age.

#### A TRANSLATION INTO GERMAN

*Grundzüge der Anatomie der wirbellosen Thiere.* Von Thomas H. Huxley, LL.D., F.R.S. Autorisirte deutsche Ausgabe, von Dr. J. W. Spengel. (Leipzig, 1878.)

SO far as we know, amongst the many German text-books on anatomy and physiology there is not a single one which is at all carried out on the plan of Huxley's *Manual of the Anatomy of Invertebrated Animals*. The great merits of the work appear to us to be, firstly, that it combines up to a certain point the features of a treatise on comparative anatomy and on zoology, and secondly, that by the introduction of a description of a type selected from each group, the learner is both greatly assisted in the practical study of animal morphology and also supplied with certain definite centres round which to group the multitudinous facts which he learns in the course of his reading. We flattered ourselves that by the translation of this work into German we should to some extent repay our Teutonic neighbours for the many text-books we have received from them. Our belief that this work was likely to be appreciated in Germany has, however, been very rudely dispelled. We learn from the distinguished naturalist who has undertaken the translation, and whose large experience (we believe his name has been before the public for so long a period as two or three years) gives corresponding weight to his opinion that the work is neither a handbook nor a text-book. He informs us in his preface that "he has decided not to give the work the title of handbook, in order to avoid labelling it with a title which it does not deserve" (um dem Buche nicht einen Anspruch unterzuschreiben, den es nicht erheben will). "It is," he goes on to say, "no handbook in the sense customary with us, and indeed can be regarded as a text-book (Lehrbuch) only in the sense that it is intended for learners." In fact, on the unimpeachable authority of Dr. Spengel, Prof. Huxley's *Manual of Invertebrata*, which has already become the acknowledged handbook in England, is quite unworthy of such a position. In this country we have been accustomed in our simplemindedness to think that Prof. Huxley possesses a singular talent for exposition, while his reputation amongst us as an anatomist is based on our belief that his knowledge of anatomical facts is as wide and extensive and as well kept up as his critical judgment is acute, and his treatment of morphological problems broad and original. We have for some time past been under the idea that

Prof. Huxley has had a good deal to do with the progress of animal morphology during the last twenty or thirty years. But we live to learn, and we feel very grateful that a man of Dr. Spengel's standing should show us how imperfect and unequal (lückenhaft und ungleichmässig) is Prof. Huxley's treatment of the subject to which he has devoted his life.

So impressed apparently was Dr. Spengel with the faults of the work which he had obtained permission to translate, that, as he explains in his preface, he asked Prof. Huxley to rewrite the work, in order that the German translation might appear more worthy of the translator's reputation. Singularly enough, Prof. Huxley, with an indifference to the appearance of any translation at all, which must have seemed strange to the translator, declined this modest request. And we gather that he invited Dr. Spengel to modify the earlier chapters (written long ago) in accordance with the views based on later researches, and expounded in the later chapters. The labour involved in such a change was apparently, not congenial to Dr. Spengel, whose energies seem more at home in writing prefatory remarks.

It is with the illustrations, however, even more than with the text of the original, that Dr. Spengel is offended. He expresses the view that the choice of these must have been made on grounds of economy. The larger number are, he says, "derived from the older works of Huxley, and the remainder from the well-known handbook of Owen (aus dem bekannten Owen'schen Handbuche), and other sources." We find some difficulty in understanding the translator's preface at this point. We presume that by "the handbook of Owen" he refers to Owen's "Lectures on the Comparative Anatomy of Invertebrates." We should very much like to know what illustrations are referred to, since, as far as the editions of Owen's lectures obtainable in this country are concerned, none of the figures of that work have been borrowed for Prof. Huxley's *Invertebrata*.

The translator informs us that he has thought fit to set aside many of Huxley's figures and to add new ones from well-known sources. He has, moreover, had a considerable number of the figures redone. In some of these cases we admit that some improvement has been effected by the alteration of the figures. The two figures copied from Ludwig to illustrate the anatomy of *Comatula* are excellent, and the substitution of Butschli's figures of *Pilidium*, for the somewhat erroneous ones of Leuckart and Pagenstecker, effects a decided improvement. In other instances the translator, in his zeal to make the figures clear, appears to have forgotten that it is also desirable to make them true to nature. Thus Fig. 77 does not appear to us to be so true a representation of the appendages of *Astacus* as the original figure of Huxley, which the translator has set aside; and in Fig. 80 the heart and vessels of *Astacus* are very far from being as true to nature as they should be. We think also the translator, in adding new figures, should be careful about the references. In the first two figures he has substituted for those of Huxley—Fig. 9 and 35-37—we find wrong references. On the whole the improvement is not so great as might have been expected. Every one is aware that for years past the illustrations of German scientific works have been far superior to those of English ones.

Such a superiority is less obvious than usual in Dr. Spengel's production. Either Dr. Spengel was generously unwilling that the difference should be too striking, or Prof. Huxley's malign influence has extended to the German engraver and printer.

Considering the view which the translator appears to take of Huxley's "Manual," we were rather surprised that he should jeopardise his great reputation by undertaking the translation of so inferior a work. Our astonishment may easily be imagined on finding on the back of the work that the *authorship is attributed to Spengel as well as to Huxley*. The outside of the book, as seen on the book-shelf, reads this:—

HUXLEY-SPENDEL  
ANATOMIE  
DER  
WIRBELLOSEN THIERE.

The only explanation which occurs to us of this unusual blending of the names of author and translator is that Dr. Spengel felt that the prominence of his name was necessary in order to ensure, for the production of so feeble an anatomist and so imperfect a writer as Prof. Huxley, a circulation large enough to bring about the pecuniary result for which the translation was made. Men have been known to make translations for the sake of a sort of parasitic, or rather "commensal" reputation; but in this case, since Dr. Spengel seems to be the superior of Prof. Huxley, some other object must have been foremost in view.

Seriously speaking, we hardly think Dr. Spengel can have fully realised the effect which such a preface would have upon the ordinary reader. Had he done so his behaviour towards Prof. Huxley would have been of a kind for which we should hesitate to use adjectives adequately descriptive.

F. M. B.

#### MERRIMAN'S "METHOD OF LEAST SQUARES"

*Elements of the Method of Least Squares.* By Mansfield Merriman, Ph.D., Instructor in Civil Engineering in the Sheffield Scientific School of Yale College. (London: Macmillan.)

THE method of least squares has an extensive literature of its own. Our author, in a sketch appended to his work, gives the titles of forty-seven of the most important memoirs and books which treat of this subject and of the law of errors of observation. He further "takes the wind out of the sails" of his reviewers by saying: "It would be easy to greatly extend the limits of this list. The titles have, in fact, been selected from a list of about four hundred, which I hope some time to publish, accompanied by historical and critical notes." Though this is an unkind cut, inasmuch as a reviewer will hardly care to bring forward any references of his own, we yet trust Dr. Merriman will be sufficiently encouraged to bring out this promised contribution to the history of a particular branch of mathematics. The writer's objects are "to present the fundamental principles and processes of the method in so plain a manner and to illustrate their application by such simple and practical examples as to render it accessible to civil engineers who have not had the benefit of extended mathematical training; and secondly,

to give an elementary exposition of the theory which should be adapted to the needs of a large and constantly-increasing class of students." Hence the book is both a practical and a theoretical one. The first part is concerned with the adjustment and comparison of engineering observations in which, after giving an introduction on the principles of probability and the method of least squares, he treats of direct observations upon a single quantity and independent observations upon several quantities, conditioned observations, and the discussions of physical observations.

The second part is devoted to the theory of least squares and probable errors; in this, after a deduction of the fundamental principles, he proceeds to the development of practical methods and formulæ.

In an Appendix he gives Gauss's method of solving normal equations, a list of literature (referred to above), remarks on the theory of least squares, and a few other short notes. A full index is given at the end. There is frequent evidence that the writer has carefully consulted the memoirs he cites in his list, so that while there is nothing of novelty in his treatment that treatment is founded upon the best authorities.

"As I have not written for mathematical experts, they will doubtless find considerable (*sic*) in the book at which to grumble." He points out what may be considered blots in his book. One is that he has adopted Gauss's development of the law of probability of error as the best adapted to an elementary presentation; "If this be objected to as defective, I claim at least the credit of knowing and of pointing out just what and where those defects are."

A consequence, perhaps, of having the work printed in this country is the list of errata. We would suggest in the event of the publication of the historical list, that the dates of reading of the memoirs should be given rather than (or at any rate in addition to) the dates of their publication.

We welcome this work as an evidence of the increasing attention that is being given to mathematics by the author's fellow-countrymen, and hope he will be encouraged by its reception here to follow up its publication with a promised work containing extended applications of the method to higher geodetic surveying and the other problems to which it can be and has been applied.

#### OUR BOOK SHELF

*Holmes' Botanical Note-Book, or Practical Guide to a Knowledge of Botany.* By E. M. Holmes, F.L.S., Curator of the Museum of the Pharmaceutical Society of Great Britain, late Lecturer on Botany at Westminster Hospital. (London: Christy and Co., 1878.)

FROM the author's experience at the Pharmaceutical Society, together with that gained during the time he held the lectureship at Westminster Hospital, he is likely to know pretty well the requirements of the students at the pharmaceutical and medical schools. It is not always, however, that a teacher, well acquainted though he may be with what is wanted by the students, is capable of providing the best material to supply those wants. In this note-book we think Mr. Holmes has succeeded in smoothing the path of the botanical course, often so uninteresting and consequently amounting to drudgery to many a student. The plan adopted of